Amendments to the Claims:

In the Claims:

1. (currently amended) A method of transmitting ~~and receiving~~ a signal having a sequence of symbols through ~~a~~ at least one channel with ~~time-reversed impulse response~~intersymbol interference, comprising the steps of:

dividing the sequence of symbols to form a plurality of symbol streams; and

processing the plurality of symbol streams before transmitting each symbol stream through a channel, wherein processing the plurality of symbol streams comprises time-reversing at least one of the symbol streams. ~~the original signal;~~

~~transmitting the time-reversed signal over the channel;~~.

~~storing and time-reversing the received signal.~~

2. (currently amended) A method of transmitting a signal of the type comprising a sequence of symbols over spaced antennas, or antennas of different polarization, to reduce fading and intersymbol interference, comprising the steps of:

~~dividing the sequence of symbols into two sequences;~~

dividing ~~the~~ a transmission frame into ~~two~~ first and second blocks;

processing the sequence of symbols ~~in said two sequences~~ to generate first, second, third, and fourth symbol sequences so that some of the symbols in at least one of the symbol sequences are time-reversed, some of the symbols in at least one of the symbol sequences are complex conjugated, and some of the symbols in at least one of the symbol sequences are negated, the third symbol sequence corresponding to the first symbol sequence and the the fourth symbol sequence corresponding to the second symbol sequence, and;

during ~~one of the blocks~~the first block of the transmission frame, applying ~~one processed~~the first symbol sequence to a first antenna and the ~~other processed signal~~second symbol sequence to a second antenna and during the ~~other~~ second block of the transmission frame applying the ~~other processed~~fourth symbol sequence to the first antenna and the ~~one processed~~third symbol sequence to the second antenna.

3. (currently amended) The method of claim 2 wherein processing the sequence of symbols comprises dividing the sequence of symbols to obtain the first and the second symbol sequences, processing the first symbol sequence to obtain the third symbol sequence, and processing the second symbol sequence to obtain the fourth symbol sequence ~~in which all of the symbols in the symbol sequence of the one and the other symbol sequence are processed during said one block of the transmission frame applying the one unprocessed signal sequence to the first antenna and the other to the second antenna, and during the block of the transmission applying the processed other symbol sequence to the first antenna and the one processed signal sequence to the other antenna~~.

4. (currently amended) A transmitter for transmitting signals of the type comprising a sequence of symbols over spaced antennas, or antennas of different polarization, to reduce fading while handling intersymbol interference efficiently, comprising:

~~a divider for dividing the sequence of symbols into two sequences;~~

~~a divider for dividing the transmission frame into two blocks;~~

a processor for processing the sequence of symbols ~~in said two sequences~~ to generate first, second, third, and fourth symbol sequences so that some of the symbols in at least one of the symbol sequences are time-reversed, some of the symbols in at least one of the symbol sequences are complex conjugated, some of the symbols in at least one of the symbol sequences are ~~time reversed~~negated, the third sequence corresponding to the first sequence and the the fourth sequence corresponding to the second sequence, and;

means for applying during ~~one~~ a first block of a transmission frame the first ~~one processed~~ symbol sequence to a first antenna and the second symbol ~~other processed signal~~ sequence to a second antenna and during ~~the other~~a second block in the transmission frame the fourth ~~applying an other processed~~ symbol sequence to the first antenna and the third~~applying an yet an other processed~~ symbol sequence to the first antenna.

5. (currently amended) The method of claim 3 wherein~~A method for processing and transmitting a signal comprising a plurality of symbols, the system comprising a first and a second spaced antennas coupled to a transmitter, said method reducing the effect of fading while handling intersymbol interference efficiently, comprising the steps of~~:

~~dividing symbols of the signal into a first and a second symbol stream wherein the first and second symbol streams each have at least two symbols;~~
~~dividing a transmission frame into a first and a second transmission block;~~

~~transmitting the first symbol stream from the first antenna during the first transmission block and transmitting the second symbol stream from the second antenna during the second transmission block;~~

processing the second symbol sequence comprises time reversing, ~~taking the~~ complex conjugating ~~conjugate form of~~ and negating the second symbol ~~stream~~sequence to generate the fourth symbol sequence; and

processing the first symbol sequence comprises time reversing and ~~taking the~~ complex conjugating ~~conjugate form of~~ the first symbol ~~stream~~sequence to generate the third symbol sequence.~~; and~~

~~transmitting from the first antenna during the second transmission block the second symbol stream in the time reversed, complex conjugate and negated form, and transmitting from the second antenna the first symbol stream in the time reversed and complex conjugate form.~~

6. (currently amended) The method of claim ~~5~~ 3 ~~wherein the method for processing and transmitting a signal further comprises each symbol having a symbol value,~~ wherein the step of dividing the sequence of symbols further comprises the step of assigning symbols to the first symbol ~~stream~~ sequence and the second symbol ~~stream~~ sequence such that there is an equal amount of symbols in each of the first and second symbol sequences and that correlation between symbols close to each other in

each of the first and second symbol sequences is not significantly effected ~~in a random fashion with respect to each symbol value~~.

7. (currently amended) The method of claim 6 wherein the step of dividing the sequence of symbols further comprises the step of assigning at least one training symbol, which is a non-data part of the signal, to each of the first and the second symbol ~~streams~~sequences.

8. (currently amended) The method of claim 7 wherein the step of assigning at least one training symbol to each of the first and the second symbol ~~streams~~ sequences further comprises the step of assigning a number of training symbols equal to ~~the~~ an anticipated delay spread to each of ~~the~~ a beginning and ~~the to~~ an end of each of the first and the second symbol ~~streams~~sequences.

9. (currently amended) The method of claim 5 wherein ~~the method for processing and transmitting a signal further comprises~~ the first and second antennas are replaced by respectively ones of a first and a second ~~group~~ groups of ~~spaced~~ antennas, each group comprising a plurality of antennas that are spaced from each other, or differently polarized with respect to each other, wherein the step of ~~transmitting~~ applying the first symbol sequence to ~~stream from~~ the first antenna ~~during the first transmission block and transmitting~~ and the second symbol sequence to ~~stream from~~ the second antenna during the first transmission block is replaced by the step of transmitting the first symbol ~~stream~~ sequence from the first group of antennas during the first transmission block using a delay diversity technique and transmitting the second symbol ~~stream~~ sequence from the second group of antennas during the first transmission block using a delay diversity technique; and

wherein the step of ~~transmitting from~~ applying the fourth symbol sequence to the first antenna during the second transmission block ~~the second symbol stream in the time reversed, complex conjugate and negated form,~~ and ~~transmitting from~~applying the third symbol sequence to the second antenna ~~the first symbol stream in the time~~

~~reversed and complex conjugate form~~ is replaced by the step of transmitting from the first group of antennas using a delay diversity technique during the second transmission block the ~~second~~ fourth symbol ~~stream~~ sequence~~in the time reversed, complex conjugate and negated form~~, and transmitting from the second group of antennas using a delay diversity technique the ~~first~~ third symbol ~~stream~~ sequence~~in the time reversed and complex conjugate form~~.

10. (currently amended) The method of claim 9 wherein ~~the system for processing and transmitting a signal further comprises~~ the first and the second groups of antennas are spaced away from each other or have different polarizations with respect to each other.

11. (currently amended) ~~In a~~A method for receiving and processing ~~a signal~~ signals transmitted from a transmitter to a receiver, ~~as in claim 2~~ comprising the steps of:

receiving ~~the~~ a first symbol ~~streams~~ stream in ~~the~~ a first block of a frame;

receiving ~~the~~ a second symbol ~~streams~~ stream in ~~the~~ a second block of the frame;

time reversing and ~~taking the~~ complex conjugating ~~conjugate form of~~ the second symbol streams to form a third symbol stream ~~in the second block~~; and

filtering the first symbol stream ~~streams in the first block and the time reversed, complex conjugate form of~~ and the third symbol stream ~~streams in the second block~~ to form decoupled outputs.

12. (currently amended) The method of claim 11 wherein the first and second symbol streams each comprises first and second portions, the first portion of the first symbol stream depending on a first pre-transmission symbol sequence $d_1(t)$ and a second portion of the first symbol stream depending on a second pre-transmission symbol sequence $d_2(t)$, the first portion of the second symbol stream depending on $d_2(t)$, the second portion of the second symbol stream depending on

$d_1(t)$, and the step of filtering further comprises filtering the first and third symbol streams using a matched filter according to

$$\begin{bmatrix} z_1(t) \\ z_2(t) \end{bmatrix} = \begin{bmatrix} h_1^*(q) & h_2(q^{-1}) \\ h_2^*(q) & -h_1(q^{-1}) \end{bmatrix} \begin{bmatrix} r_1(t) \\ r_2(t) \end{bmatrix}$$

wherein $r_1(t)$ and $r_2(t)$ are the first and third symbol streams, respectively, $z_1(t)$ and $z_2(t)$ are the decoupled outputs, ~~where~~ $h_1(q^{-1})$ is ~~a time-discrete linear finite impulse response filter described as~~ a polynomial in ~~the~~ a unit delay operator q^{-1}, describing ~~the~~ a first channel ~~associated with the signals transmitted over antenna 1~~ from which the first portion of the first symbol stream is received, ~~and~~ $h_2(q^{-1})$ is a polynomial in the unit delay operator q^{-1}, describing a second channel from which the second portion of the first symbol stream is received, ~~the corresponding description of the channel associated with signals transmitted from antenna 2. The polynomials~~ $h_1^*(q)$ and $h_2^*(q)$ are polynomials in ~~the~~ a unit advance operator q ~~represent the~~ representing effective ~~channel~~channels from which the first and second portions of the second symbol stream are received, respectively, ~~experienced by signals that are time reversed, transmitted from antenna 1 and antenna 2 respectively, and whose received sequence of samples are time reversed. The signals $r_1(t)$ and $r_2(t)$ are the received and processed signals of claim 7. The signal $r_1(t)$ is the signal received during the first block of the frame and the signal $r_2(t)$ is the signal received during the second block of the frame, time reversed and complex conjugated. The signals $z_1(t)$ and $z_2(t)$ are the output after the matched filtering. The signals~~ outputs $z_1(t)$ and $z_2(t)$ ~~are~~ being decoupled in ~~the sense~~ that $z_1(t)$ ~~only~~ depends on ~~$d_1(t)$~~ the first pre-transmission symbol stream $d_1(t)$ and not on the second pre-transmission symbol stream $d_2(t)$, and $z_2(t)$ ~~only~~ depends on the second pre-transmission symbol stream $d_2(t)$ and not on the first pre-transmission symbol stream $d_1(t)$.

13. (currently amended) The method of claim 11 further comprising the step of:

after the step of filtering, estimating the ~~signal in~~ symbol stream $d_1(t)$ from ~~signal~~ output $z_1(t)$ and symbol stream $d_2(t)$ from ~~signal~~ output $z_2(t)$.

14. (currently amended) The method of claim 11 where ~~the signal~~ each of the first and second symbol streams is received by multiple antennas and is combined in order to increase ~~the~~ signal quality and ~~reduced the~~ reduce interference ~~and otherwise is processed as in claim 7~~.

15. (currently amended) A ~~method~~ system for transmitting data while reducing the effects of fading and handling intersymbol interference efficiently comprising:

~~a transmitting station including:~~

~~(a)~~ a first antenna and a second antenna; and

~~(b)~~ an encoder coupled to the first and second antennas and adapted to divide a signal into a first and a second symbol stream, each symbol stream having a plurality of symbols, the encoder adapted to transmit the first symbol stream through the first antenna during a first block of a transmission frame, to transmit the second symbol stream through the second antenna during ~~a~~ the first block of ~~a~~ the transmission frame, to transmit through the second antenna a time reversed and complex conjugate form of the first symbol stream during a second block of ~~a~~ the transmission frame, and to transmit through the first antenna a time reversed, complex conjugate and negated form of the second symbol stream during ~~a~~ the second block of ~~a~~ the transmission frame.

16. (currently amended) The system of claim 15 wherein each symbol has a symbol value and the encoder is further adapted to assign the symbols to each of the first symbol stream and the second symbol stream such that there is an equal amount of symbols in each of the first and second symbol streams ~~in a random fashion with~~

~~respect to each symbol value~~.

17. (original) The system of claim 15 wherein the encoder is further adapted to assign at least one training symbol, which is a non-data part of the signal, to each of the first and second symbol streams.

18. (currently amended) The system of claim ~~17~~ 15 wherein the encoder is further adapted to assign a number of training symbols, which is a non-data part of the signal, equal to ~~the~~ a delay spread to each of ~~the~~ a beginning and ~~to the~~an end of each of the first and the second symbol streams.

19. (currently amended) A system for transmitting data while reducing the effects of fading and handling intersymbol interference effectively comprising:

~~a transmitting station including:~~

~~(a)~~ a first antenna group and a second antenna group, each group comprising a plurality of antennas; and

~~(b)~~ an encoder coupled to the first and second antenna groups and adapted to divide a signal into a first and a second symbol ~~stream~~streams, each symbol stream having a plurality of symbols, the encoder adapted to transmit the first symbol stream through the first antenna group using a delay diversity technique during a first block of a frame, to transmit the second symbol stream through the second antenna group using a delay diversity technique during ~~a~~ the first block of ~~a~~ the frame, to transmit through the second antenna group a time reversed and complex conjugate form of the first symbol stream during a second block of ~~a~~ the frame, and to transmit through the first antenna group a time reversed, complex conjugate and negated form of the second symbol stream during ~~a~~ the second block of ~~a~~ the frame.

20. (original) The system in claim 19 wherein the antennas within each group are spaced apart from one another.

21. (Cancelled)

22. (currently amended) The system in claim 20 further comprises:

a first and a second antenna within the first antenna group; and

the encoder is further adapted to use a delay diversity technique wherein ~~the encoder begins transmitting~~ the first symbol stream is transmitted from the first antenna and after a delay period ~~the encoder begins transmitting~~ the first symbol stream is transmitted from the second antenna.

23. (currently amended) The system of claim ~~22~~ 19 wherein each symbol has a symbol value and the encoder is further adapted to assign the symbols to each of the first symbol stream and the second symbol stream such that there is an equal amount of symbols in each of the first and second symbol streams ~~in a random fashion with respect to each symbol value~~.

24. (original) The system of claim 23 wherein the encoder is further adapted to assign at least one training symbol, which is a non-data part of the signal, to each of the first and second symbol streams.

25. (currently amended) The system of claim 24 wherein the encoder is further adapted to assign a number of training symbols, which is a non-data part of the signal, equal to ~~the~~ an anticipated delay spread to each of ~~the~~ a beginning and ~~to the~~an end of each of the first and the second symbol streams.

26. (Cancelled)

27. (original) The system in claim 19 wherein the antennas within each group have polarizations different from one another.

28. (currently amended) A system for receiving and processing data ~~transmitted pursuant to claim 15 or 19 while reducing the effects of fading and handling intersymbol interference efficiently~~ comprising:

~~a receiving station including:~~

~~(a) an~~ at least one antenna adapted to receive ~~symbols from a transmission, the transmission divided into a first block and a second block, each block comprising~~ a first symbol stream in a first block of a frame and a second symbol stream in a second block of the frame, each symbol stream comprising a plurality of symbols;

~~(b)~~ a combining filter coupled to the antenna and adapted to ~~receive symbols through the antenna from the first block and the second block wherein the combining filter generates~~ form a third symbol stream that is a time reversed and complex conjugate form of the second symbol stream received in the second block; and

~~(c)~~ a matched filter coupled to the combining filter and adapted to ~~receive the first block of the transmission and the time reversed, complex conjugate form of the second block and~~ form ~~a~~ decoupled first and second ~~output~~ outputs from the first and third symbol streams.

29. (original) The system of claim 28 further comprising an equalizer adapted to resolve intersymbol interference in the first and second blocks.

30. (currently amended) The ~~method~~ system of claim 28 wherein the first and second symbol streams each comprises first and second portions, the first portion of the first symbol stream depending on a first pre-transmission symbol sequence $d_1(t)$ and a second portion of the first symbol stream depending on a second pre-transmission symbol sequence $d_2(t)$, the first portion of the second symbol stream depending on $d_2(t)$, the second portion of the second symbol stream depending on $d_1(t)$, and the ~~step of filtering further comprises a~~ matched filter forms the decoupled first and second outputs according to

$$\begin{bmatrix} z_1(t) \\ z_2(t) \end{bmatrix} = \begin{bmatrix} h_1^*(q) & h_2(q^{-1}) \\ h_2^*(q) & -h_1(q^{-1}) \end{bmatrix} \begin{bmatrix} r_1(t) \\ r_2(t) \end{bmatrix}$$

wherein $r_1(t)$ and $r_2(t)$ are the first and third symbol streams, respectively, $z_1(t)$ and $z_2(t)$ are the decoupled first and second outputs, respectively, ~~where~~ $h_1(q^{-1})$ is ~~a time-discrete linear finite impulse response filter described as~~ a polynomial in ~~the~~ a unit delay operator q^{-1}, describing ~~the~~ a first channel from which the first portion of the first symbol stream is received, ~~associated with the signals transmitted over antenna 1 and~~ $h_2(q^{-1})$ is a polynomial in the unit delay operator q^{-1}, describing a second channel from which the second portion of the first symbol stream is received, ~~the corresponding description of the channel associated with signals transmitted from antenna 2. The polynomials~~ $h_1^*(q)$ and $h_2^*(q)$ are polynomials in ~~the~~ a unit advance operator q ~~represent the~~ representing effective ~~channel~~ channels from which the first and second portions of the second symbol streams are received, respectively~~experienced by signals that are time reversed, transmitted from antenna 1 and antenna 2 respectively, and whose received sequence of samples are time reversed. The signals $r_1(t)$ and $r_2(t)$ are the received and processed signals of claim 7~~. ~~The signal $r_1(t)$ is the signal received during the first block of the frame and the signal $r_2(t)$ is the signal received during the second block of the frame, time reversed and complex conjugated. The signals $z_1(t)$ and $z_2(t)$ are the output after the matched filtering. The signals~~ outputs $z_1(t)$ and $z_2(t)$ are decoupled in ~~the sense~~ that $z_1(t)$ ~~only~~ depends on the first pre-transmission symbol stream $d_1(t)$ and not on the second pre-transmission symbol stream $d_2(t)$, and $z_2(t)$ ~~only~~ depends on $d_2(t)$ and not on $d_1(t)$.

31. (currently amended) The system of claim 30 further comprising:

an estimator adapted to estimating the first pre-transmission symbol stream $d_1(t)$ and the second pre-transmission symbol stream $d_2(t)$ ~~the signal~~ from the decoupled outputs $z_1(t)$ and $z_2(t)$, respectively.

32. (currently amended) The ~~method of claim 11 where the signal~~ system of claim 28 wherein each of the first and second symbol streams is received by multiple antennas and is combined in order to increase ~~the~~ signal quality and ~~reduced~~ reduce ~~the~~ interference ~~and otherwise is processed as in claim 7~~.

33. (currently amended) The system of claim ~~11 or 12~~28 further comprising an equalizer adapted to resolve intersymbol interference in the first and second blocks.

34. (currently amended) A method for receiving and processing ~~symbol sequences~~ signals transmitted from a transmitter ~~in accordance with claims 2, 3 or 5~~ comprising receiving a plurality of symbol sequences each comprising symbols from a plurality of pre-transmission symbol streams, and processing the received symbol sequences to generate decoupled outputs each for ~~so that the detection of~~ separately detecting a different one of the pre-transmission symbol streams ~~$d_1(t)$ and $d_2(t)$~~, wherein processing the received symbol sequences comprises time reversing at least one of the symbol sequences ~~effectively decouple into detection of two separate symbol streams rather than joint detection of two symbol streams, thereby considerably simplifying the detection~~.

35. (New) The method of claim 34 wherein processing the received symbol sequences further comprises complex conjugating at least one of the symbol sequences, and filtering at least one symbol sequence in its received form and at least one symbol sequence in a time-reversed and complex conjugated form to generate the decoupled outputs.

36. (New) The method of claim 34 wherein the plurality of symbol sequences are received from one or more channels and comprise known symbols, the

method further comprising estimating the one or more channels using the known symbols.

37. (New) The method of claim 1 wherein dividing the sequence of symbols comprises assigning symbols in the sequence of symbols to a first symbol stream and a second stream such that there is an equal amount of symbols in each of the first and second symbol streams and that correlation between symbols close to each other in each of the first and second symbol streams is not significantly effected.

38. (New) The method of claim 1 wherein processing the plurality of symbols streams further comprises complex conjugating at least one of the symbol streams.

39. (New) The method of claim 12 wherein the first and second symbol streams comprise known symbols, the method further comprising estimating the first and the second channels using the known symbols.

40. (New) The system of claim 30 wherein the first and second symbol streams comprise known symbols, the system further comprising a channel estimator adapted to estimate the first and the second channels using the known symbols.

41 (New) An apparatus for receiving and processing signals transmitted from a transmitter, comprising:

means for receiving a plurality of symbol sequences, each symbol sequence comprising symbols from a plurality of pre-transmission symbol streams; and

means for processing the received symbol sequences to generate decoupled outputs each for separately detecting a different one of the pre-transmission symbol streams, wherein the means for processing the received symbol sequences comprises means for time reversing at least one of the symbol sequences.

42. (New) The apparatus of claim 41 wherein the means for processing the received symbol sequences further comprises means for forming complex-conjugated forms of at least one of the symbol sequences.

43. (New) The apparatus of claim 42 wherein the means for processing the received symbol sequences further comprises means for filtering at least one symbol sequence in its received form and at least one symbol sequence in a time-reversed and complex conjugated form to generate the decoupled outputs, each decoupled output depending on a different one of the pre-transmission symbol streams.